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Enhancing Early Innovation in an Urban Living Lab: Lessons from Espoo, Finland

Soile Juujärvi and Virpi Lund

> *"It is in the field of ignorance that the spark of something new is most often ignited."*
>
> Lotte Darsø
> Innovation researcher

Urban areas are often characterized by complex problems, such as social and economic deprivation, segregation, or bureaucratic administration. Urban living laboratories provide a promising approach to redefining and tackling such problems in novel ways by enabling bottom-up innovation with various actors. The present study examined an urban living lab initiative in a suburban area of Espoo, Finland, where guided workshops based on the Change Laboratory method were arranged. The findings show that, before development projects are launched, it is important to dedicate sufficient time to the early innovation process, which includes building relationships, sharing knowledge, exploring ignorance, and innovating new concepts. The study emphasizes the importance of distinguishing early innovation processes from later ones, which means separating the "preject" from the "project". We conclude that successful management of an urban living lab combines bottom-up and top-down approaches.

Introduction

Living laboratories have increasingly been used as platforms for innovation and experimentation in urban areas, involving key features of open innovation, a multi-stakeholder approach, real-life environments, and residents as users (Friedlich et al., 2013; Veeckman & Graaf, 2015). The goals of urban living labs can vary according to their environments, from small-scale experiments of new technology and services to large-scale social and economic improvement (Franz et al., 2015). In addition to complex problems in physical environments, there are social and economic problems that are difficult to understand and handle due to their multidimensional nature, such as stigmatization, unemployment, and segregation of ethnic minorities. There are also problems due to organized complexity: a multiplicity of organizations steering the region can result in competitive and overlapping systems of administration (Baynes, 2013; Wallin, 2013). Due to multi-layered problems, urban living labs call for practice-based innovation with diffuse and heterogeneous knowledge production, instead of homogenous accumulation of knowledge and clearly-defined problem solving (Melkas & Harmaakorpi, 2008). Thus, an urban living lab usually starts as a bottom-up process setting additional challenges for problem definition and the composition of actors.

The purpose of this article is to describe an urban living lab initiative in a suburban area by examining the early phase of its innovation process, which is also called the front-end phase in research literature. The front-end phase refers to the starting point of the project where opportunities are identified and concepts are created through adaptive interactions between participants. In our case, participants represented a range of living lab roles: enablers, providers, utilizers, and residents as users (Juujärvi & Pesso, 2013a; Leminen et al., 2012), whose further analysis is beyond the scope of this study. The present article is focused on advancing the urban living lab approach as an innovation method for urban development. We start by discussing the concept of the urban living lab and its implications for the early innovation process.

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Urban Living Labs

The emerging interest in urban living labs calls for more precise definitions of the concept. An urban living lab has been defined as a forum for innovation that integrates residents and other stakeholders to develop and test new ideas, systems, and solutions in complex and real contexts (see Friedlich et al., 2013). Referring to Almirall and Wareham (2008), it can be seen as a specific type of open innovation network that acts as an intermediary between residents, public organizations, and private organizations to capture and codify user insights in their living environments. Franz, Tausz, and Thiel (2015) further distinguish technologically and socially oriented urban living labs, with the former ones focusing on co-developing new products and services and the latter ones dealing with the wider scope of urban and city development to improve living environments involving technological, social, and political questions. In socially oriented urban living labs, users have versatile roles as residents and citizens, and consequently, citizen participatory and co-creation processes are intertwined (Franz et al., 2015; Juujärvi & Pesso, 2013a). Consistent with this view, an urban living lab has been defined as a regional forum for innovation and dialogue focusing on solving challenges in the urban area (Friedlich et al., 2013).

Previous studies suggest that urban living labs may have various goals ranging in size and contents and calling for different forms of collaboration (see Leminen & Westerlund, 2015). In this article, we focus on socially oriented urban living labs, which are characterized by citizen participation, strong collaboration with local stakeholders, and the aim to create concepts and methodology that can be transferred into other contexts (see Franz et al., 2015). Proactive networking, experimentation as a bottom-up process, as well as commitment and longevity in development work has been previously suggested to be success factors for urban living labs (Juujärvi & Pesso, 2013a). Juujärvi and Pesso (2013a) have further elaborated actor roles for successful urban living labs. City representatives as enablers and public authorities bear an important role in creating a vision and allocating public resources. They also provide strategic leadership, promote networking across administrative units, and create public–private–people partnerships. Utilizers, such as firms and non-governmental associations, produce place-based knowledge and set small-scale objectives, and they pursue the creation of products and services suitable to the area and its residents. Research institutions engage researchers and students in development work, provide innovative methods, and take responsibility for systematic knowledge augmentation. Residents as users produce place-based user experiences, participate in experiments, and empower other citizens through co-creation.

When starting an urban living lab, it is first important to bring multiple actors together and engage them in creating a shared vision. However, collaboration in living laboratories is challenged by power struggles and inadequate cooperation skills, and therefore, actors need to learn to interact with others in the first place (Hakkarainen & Hyysalo, 2013). In particular, the role of residents is vulnerable, because their local knowledge and use of natural language is not compatible with the jargon of experts (Staffans, 2014).

Previous studies raise the question of how urban living labs should be coordinated in order to utilize their full innovation potential, which lies on the boundaries between different groups and actors (Melkas & Harmaakorpi, 2008). Socially oriented urban living labs are based on so-called Mode 2 innovation activity that is organized around a particular application, and innovators need to combine different types of information from scattered sources over lengthy periods (Gibbons et al., 1994; Melkas & Harmaakorpi, 2008.) This raises the question of how Mode 2 innovation activity could be best coordinated. Leminen (2013) distinguishes bottom-up and top-down approaches for coordinating innovation activities, with the former operating at the grassroots levels and focusing on local needs, and latter pursuing centralized and official targets. A bottom-up approach is facilitated rather than managed, whereas a top-down approach is managed rather than facilitated (Leminen et al., 2012). Leminen (2013) further points out that enabler-driven living labs (e.g., driven by city representatives) and user-driven labs (e.g., driven by residents) are characterized by bottom-up coordination, whereas provider-driven labs (e.g., driven by R&D institutions) and utilizer-driven labs (e.g., driven by companies) tend to be top-down coordinated.

Consistent with some previous studies (Lievens et al., 2011; Sauer, 2012) we argue that urban living labs should combine bottom-up and top-down developments. Whereas a bottom-up approach helps to identify needs and unanticipated ideas, a top-down approach is needed to validate ideas and concepts and to provide a formal structure. Urban living labs have usually been led by enablers collecting needs identified within the region through networking, involving a risk that innovation activities remain as information-sharing networks (see Leminen et al., 2012). Although the involvement of

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enablers gives urban living labs authority and legitimacy, they rarely possess R&D methodologies to transform harvested ideas towards realizing large-scale societal goals. As a result of ineffective collaboration, residents and other actors may become frustrated and give up their participatory efforts (Friedlich et al., 2013).

The aim of the present study is to advance understanding about the early innovation process and its facilitation or management. In-depth studies of microprocesses in living lab development are rare (Hakkarainen & Hyysalo, 2013), and we wish to examine how early innovation process develops within emerging urban living labs activities. For this purpose, we first introduce a model developed by Darsø (2003) based on team processes in an international company. While doing so, we presume that successful innovation processes are basically team processes regardless of the context (Juujärvi & Pesso, 2013b).

The remainders of the article is organized as follows. After discussing the early innovation process, we describe our intervention method for urban living lab development using community workshops. Next, we present our research design and findings. Finally, we provide conclusions.

The Early Innovation Process

Several models of innovation emphasize the importance of the early innovation process for nurturing creativity at the level of interaction. Among the most well-known ones is the model of knowledge creation by Nonaka and Takeuchi (1995) and further developed by Nonaka and Konno (1998). In their model, the innovation process is seen a collective learning spiral that increases knowledge through four arenas *(bas)*. In brief, the phases are described by Nonaka and Konno (1998) as follows:

1. Socialization to originating *ba* involves sharing of tacit knowledge, that is, each individual's mental model, through physical proximity and face-to-face contact, which creates common understanding and mutual trust among group members.

2. Externalization to interacting *ba* means the expression of tacit knowledge and its translation into concepts, and making it understandable to others through dialogue.

3. Combination to cyber *ba* combines new knowledge with existing knowledge into explicit knowledge, transcending the group through different media.

4. Internalization to exercising *ba* converts explicit knowledge into tacit knowledge in practice through experiments or simulations

The model of knowledge creation points out the importance of sharing tacit knowledge and explicates much of what happens in urban living lab activities. Although the model creates general understanding about the innovation process, it seems too theoretical in practical matters of urban living lab management. Therefore, we turn to a model developed by Darsø (2003), who investigated innovation teams of a large international company and identified two distinctive phases for a successful innovation process: a *project* and a *preject*. The project refers to the usual project management with goal definition and limited time; it seeks results, prefers linear progress towards goals, and employs convergent thinking and fast decision making. However, in successful innovation processes, the project is preceded by prolonged goal seeking and the emergence of divergent thinking in an open decision space, where a group of people searches for novel knowledge and probes new possibilities. From the perspective of management, this period – the preject – may seem chaotic, but it is crucial for generating radical innovations. Darsø (2003) emphasizes that the preject needs a different type of management that utilizes diverse leadership roles and functions, as identified previously in the group theory literature (e.g., Johnson & Johnson, 2002). Most importantly, to enhance preject development, one needs to know the critical parameters of the preject, which Darsø has crystallized in the diamond of innovation model: building relationships, developing knowledge, exploring ignorance, innovating new concepts) (Figure 1).

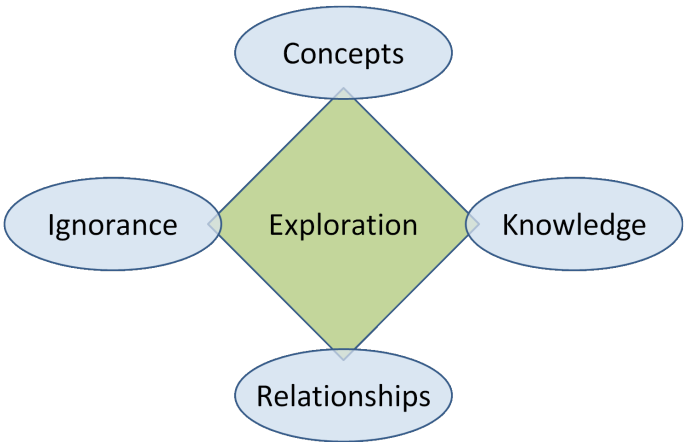

Figure 1. The diamond of innovation model (adapted from Darsø, 2003)

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Knowledge in innovation processes is under constant development and has different modes, such as scientific knowledge and personal knowledge that is developed through experience, reflection, and practice. In the innovation literature, personal knowledge is seen mostly as a positive contribution, but Darsø warns that it may include personal beliefs and attitudes that may hinder group development, rather than open up new possibilities. In addition to these modes of knowledge, it is important to acknowledge the role of tacit knowledge that is transformed into explicit concepts in innovation processes (Nonaka & Takeuchi, 1995).

Relationships have a great influence on the quality of the results; mutual trust and honest communication is needed to venture into areas of new possibilities. Relationships can be determined by discussing each participant's expectations and wishes, and their level of ambition in relation to the project. Possibilities to link evolving common goals with personal ones are important, because personal goals motivate participants and enhance commitment (see Bandura, 2001). In the living lab context, it is especially important to identify user motivations that are usually based on personal, rather than professional, interests. Their participation is voluntary, and consequently, strong motivation is needed for long-term engagement.

Ignorance is the most important parameter in the diamond of innovation, because it provokes questions that boost the innovation process. However, participants who reveal their ignorance are susceptible to criticism, which again underscores the need for mutual trust and a supportive atmosphere. Finally, developing new concepts signals the emergence of innovation ideas. Words are often insufficient, and therefore, conceptualization can be advanced through drawings, figures, or 3D models. Whether incremental or radical, concepts are not yet innovations, but can become them through further development (Darsø, 2003).

Darsø (2003) further emphasizes that the poles of the axes in the model are not contradictory but complementary and reinforcing, and they can be worked on at the same time. Knowledge and ignorance can be present simultaneously, and continuous movement between them is important. Similarly, conversation about personal interests may stimulate and expand understanding about concepts, and vice versa.

Thus, the rationale of the present study is based on the assumption that, due to the multidimensional nature of urban problems, innovation processes in urban living labs are at high risk of inadequately defining problems. Therefore, a successful urban living lab initiative may require project management to nurture the early innovation process (i.e., the preject), which can be complemented by project planning, as shown in the case study that follows.

Case Study: Espoo Centre, Finland

This study is part of a three-year participatory action research project (Kemmis &McTaggart, 2000) to examine and enhance residents' participation in urban development and to develop efficient means for residents and stakeholders to collaborate in urban development. The research project included wide context mapping with interview with 32 residents and 64 stakeholders, participation in local development networks, and two main interventions: i) special workshops for residents (Juujärvi & Lund, unpublished) and ii) residents and stakeholders (i.e., community workshops). The focus area is Espoo Centre, a part of the municipal district in the City of Espoo in southern Finland, which consists of the administrative centre of the city and two surrounding neighbourhoods, with a total population of 17,000. The area is characterized by different historical layers in terms of construction of social housing, and waves of migration, mainly refugees, from the 1970s onwards. Cultural diversity in daily life is reflected in a high proportion of immigrants and more than 70 spoken languages. According to social and economic indicators, the area represents the least advantaged suburb in the City of Espoo. The area's strengths include good transportation and services, and access to surrounding natural areas that enable outdoor activities (Hirvonen, 2011; Residents' Welfare in Espoo, 2013). Several academic research projects have pinpointed challenges of the area, and consequently, the city of Espoo has undertaken several projects to improve the environment and launch a regeneration process. In recent decades, non-profit agencies in particular have been eager to start different kinds of development initiatives to improve social cohesion and the wellbeing of citizens.

Community Workshops

The present study was motivated by two main observations within the overall project: i) resident have so far shown low engagement in development endeavours and ii) there has been a lack of systematic collaboration among various stakeholders and developers. The living lab approach was assumed to provide an appropriate innovation platform for a systematic collaboration initiative that would bring together actors who do not

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necessarily know each other, but who would be expected to exploit each other's resources and expertise. For this purpose, a special method called "community workshops" was designed and implemented. The community workshops method represents an application of the Change Laboratory, which is based on the theory of expansive learning (Engeström & Sannino, 2010) and has been widely applied for promoting innovation and learning within organizations. The Change Laboratory is a formative intervention method where new ideas are developed and put into action in a social process of innovation. Researchers act as interventionists in the process by providing tools for envisioning, designing, and experimenting with novel forms of activities. The rationale behind interventions is to expand participants' understanding about the objects of development work, thereby enabling shared goals and enhancing collaboration. Each workshop has a specific purpose to deepen the innovation process (Virkkunen & Newnham, 2013). Based on our previous pilot (Juujärvi & Pesso, 2012), we expected that the community workshops would combine bottom-up and top-down approaches, because they engage stakeholders and residents in transforming grassroots ideas into new activities and allow enablers to play an active role in shaping the shared vision and boosting activities.

The community workshops included five successive workshops in early 2015 as follows: i) charting the situation; ii) analyzing contradictions and issues with the situation; iii) creating new models; iv) concretizing new models and then experimenting during a period of two months; and v) evaluating the experiments and making decisions about their consolidation. The workshop process yielded four experiments, which each represented new forms of practices in urban development. They represented social innovations, such as co-planning of a local community house, a multi-actor steering group for regional development, a multicultural food festival, and a multi-event square for citizens. Common characteristics in each new practice were that they required developing partnerships and coordinating multiple resources.

The approximately two-hour workshop programme included presentations of pieces of research data, speeches about future lines of development, and various innovation methods. Between 30 and 40 people attended each of the five workshops. The participants were residents, members of resident associations, managers of regeneration projects, city planners, civil servants, representatives of non-profit organizations and local parishes, and managers of shopping malls. The workshops were managed by a consultant qualified to practice the Change Laboratory method in collaboration with four researchers, including the authors, who acted as group facilitators.

Research Design

We employed ethnographic methods of participatory action research (Kemmis & McTaggart, 2000), meaning that we recorded video of all workshop activities, recorded and partly transcribed small-group discussions, and documented the materials. We acted as group facilitators and made observations on interactions and each member's role therein, and we later checked those observations by reviewing the recordings. We acquainted ourselves with the early innovation process and reviewed material from all workshops several times in order to obtain an overall view of the process and re-plan activities for the forthcoming workshop.

It became evident that the third and fourth workshops were the most critical ones. In the third workshop, newly-formed teams started to innovate and plan experiments based on the shared interest (the third workshop); In the fourth workshop, teams finalized and cross-evaluated their plans for experimenting with new ways of collaborating. Therefore, we decided to limit the analysis to these two workshops, which yielded approximately 19 hours of recordings that were partially transcribed.

Qualitative directive content analysis was employed, meaning that data are initially coded with categories derived from existing theories then are complemented with themes emerging from the data. The ultimate purpose is to validate or extend a conceptual framework or theory (Boyatzis, 1998; Zhang & Wildemuth, 2000). This analysis was guided by the following research questions:

1. *How are the features of the preject manifested in workshop activities?*

2. *How can the process of the preject be enhanced by workshop interventions?*

The analysis proceeded as follows. The first author listened to recordings and wrote down observations that were cross-checked by the second author and compared with earlier observations made by the group facilitators. Then, the written observations were coded into categories derived from the components of the preject (i.e., building relationships, developing knowledge, exploring ignorance, innovating new concepts). The content of each category was compared with the theory, and some

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sub-categories providing evidence of new knowledge were added. Finally, the categories were written as descriptions presented in the findings. With regard to the second research question (How can the process of the preject be enhanced by workshop interventions?), we decided to describe the interventions at the third workshop because they reveal the dynamics between them and the innovation of new concepts.

Workshop Interventions

The objective of the third workshop was to shape goals for near-future development and start to plan experiments based on the previous analysis of contradictions and conflicts in current practices that have hampered development actions in the area (Virkkunen & Newnham, 2013). The participants were guided to choose a group with a pre-determined theme that emerged from the previous workshops and that would match their interests (e.g., multicultural integration, common premises, coordination of urban development, "wild card"). Following the guidelines of the Change Laboratory method, three sets of stimuli were given at different points of the workshop to provoke innovative thinking: i) a synopsis of contradictions in current development presented by a principal researcher, ii) a speech about future urban development given by a director of the city planning department, and iii) a shared group reflection on future possibilities by five volunteering participants. The purpose of these interventions was to enhance common understanding on goal setting and to help participants shape their roles in planned experiments, but the retrospective analysis also revealed unintended positive effects. The most powerful one was the director's speech, which triggered creating new concepts among the participants.

The director told about future lines of local urban planning up to 2030, based on an envisioned zoning scheme of the area. City planning would be focused on laying foundations for a physical environment of high quality, which in turn shall enhance residents' wellbeing and sense of community, for example, by creating meeting places. However, he also emphasized that urban planning procedures do not involve means that would directly address to the problems identified by the participants in the current workshops. Social and cultural aspects are not sufficiently taken into account in the zoning process, and there is a lack of multi-professional cooperation due to the rigid boundaries of administrative units. He admitted his ignorance about how to proceed with these deficiencies and invited the audience to give him some advice and ideas.

The speech was followed by reflections in pairs and a lively plenary discussion, in which participants pointed out critical aspects lacking in city planning: the plan did not cover aspects of social and cultural development, and more specifically, it did not provide any means to prevent further segregation of immigrant groups. The recordings in small-group reflections revealed that the speech had triggered innovative new concepts to overcome limitations of the current city planning. The concept was later explicated in the plenary discussion as social zoning, as illustrated by the following participant comments:

> *"I have never thought before that, in zoning, there are no marks for social things. It is a weird idea, an interesting idea, it fascinates me."*
>
> *"Is community-building a solution for involving social and cultural development in the zoning process? But what is a name for this process? Is it a zoning scheme? How could social aspects be marked on the scheme in some way? How do you put them on it?"*
>
> *"We need social and cultural strategies in zoning, but what is the word for this?"*
>
> *"We can elaborate what it [social zoning] could be. Now it is hidden between the lines of scheme markings."*

After the interventions, the groups were instructed to start planning an experiment for a new way of stakeholder collaboration within the following two months. The participants were encouraged to change their group choice if it no longer matched their interests. The planning continued in the successive workshop, and the evolving plans were cross-evaluated at several points.

The Preject's Group Process

All established teams succeeded in generating a solid plan for their experiments, which represented new cooperational initiatives, including a regional development committee, the co-design of a local community house, a citizen square, and a multicultural food festival. Each planning process involved the elements of the early innovation process: building relationships and sharing knowledge preceding exploring ignorance and innovating new concepts complemented with refinements, as shown in Figure 2. The order of the elements is logical rather than chronological; the teams changed

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their focus back and forth during the process. In addition, even though all elements could be discerned from the flow of discussion, they were not equally balanced across the teams.

Building relationships took place through the whole process. In the beginning, group members introduced themselves and gave some background information, but later on, they started to ask about and reveal their personal motivations and interests, leading to in-depth discussions. Participants also built friendships and working alliances across the teams. Multiple discussions as a part of the Change Laboratory procedure encouraged them to informally reveal to each other their personal interests, motivations, and feelings.

The important step in building relationships was the emergence of *actor roles,* which took place after the teams started to plan their innovation projects on the later rounds of the cycle (see Figure 2). In particular, city representatives as enablers had a distinguished role in creating a vision and allocating resources. The representatives of the firms and non-governmental organizations (NGOs) were eager to pursue new services and operational models, and residents showed nuanced knowledge of local conditions and empowered other citizens to participate in forthcoming experiments, which is consistent with previous findings (Juujärvi & Pesso, 2013a). These roles, however, emerged as a result of the planning process and were situation-contingent rather than based on participants' acknowledged positions or expertise (Nyström et al., 2014). One team member could play multiple roles while being a key driver in the process. Some participants adopted the role of provider/developer, which is strongly encouraged by the Change Laboratory methods. The teams also missed some roles in beginning, typically utilizer or enabler, to accomplish intended actions, and started to look for them outside.

Sharing knowledge was critically tied to building relationships, because participants got to know each other by exchanging knowledge. The exchange of tacit knowledge included sharing personal ways of thinking and emotional outbursts revealing values and attitudes, and its exchange was present through the process. Delivering *tacit knowledge* was supported by physical proximity in small groups and intensive working periods, and it enabled building a highly positive, lighthearted with plenty of joking and laughing (Nonaka & Takeuchi, 1995). Knowledge included participants' specific *local knowledge* that was especially useful when defining problems. The *expert knowledge* of team members was exploited when the plans were realized; during the ideation process, it was largely ignored.

Scrutinizing limitations of current practices is a starting point for development actions in the Change Laboratory method, and therefore, exploring one's own ignorance grows a collective effort to explore the limits of shared knowledge. Ignorance was explored to varying degrees among teams and it was largely induced by the interventions, especially the director's speech, which revealed his own ignorance, as described above. When reflecting on ignorance, participants also hinted about their own skills and expertise, and therefore, this element was renamed as *exploring limits of expertise* (see Figure 2). This in turn prompted *innovative ideas,* which were further elaborated into *new concepts.* The teams struggled to find an appropriate name for their future experiments, because the familiar ones did not align with the core intent of their innovation, as illustrated by the following comments from participants:

> *"Even though the regional welfare group we used to have in past has been ceased, it should be something like this. But it must have a different name. But unlike it, this group must have responsibility, duties, and resources; it cannot be any sort of discussion or coffee drinking club."*

> *"Based on its tasks, it ought to be a regional development group. It is an awfully dull name, but it is what this all is about."*

> *"We are not satisfied with this name. It must be much cooler, more attractive. Let's put it in quotation marks."*

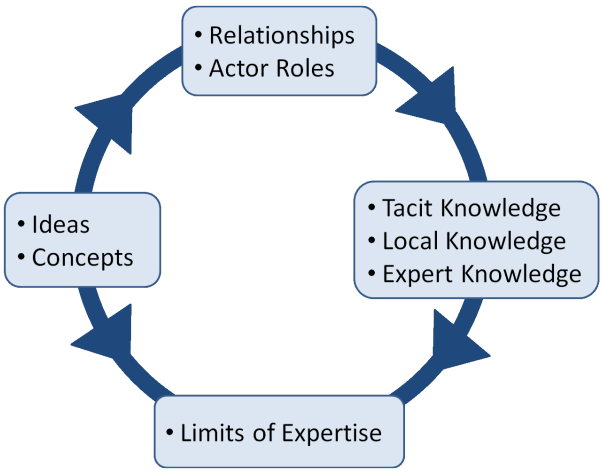

Figure 2. Group process of a preject

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The complexity of the concept was related to the length of the joint group process. In two teams, most members had joined together in the previous workshops, and had already shared ideas to some extent. These teams had lively, enriching discussions. In contrast, two other teams had several member changes between the workshops. They spent a lot time exchanging knowledge and getting to know each other and were forced into premature decisions due to time limits in the previous workshop, which caused them to spend time reshaping ideas in the successive workshop.

Conclusion

This article elaborated the early innovation process in an urban living lab initiative and resulted in several new practices in urban development. They represented social innovations created through collaboration between participants representing diverse living lab roles. It became evident that all living lab roles were needed to realize innovation intents. The strength of socially oriented urban living labs situated in a certain geographical region lies in the dissemination of local knowledge along emerging social networks (Melkas & Harmaakorpi, 2008). The bottom-up approach is a suitable starting point for problem definition and brainstorming, but it must be adjusted by a top-down approach that provides information about official visions, goals, plans, and procedures. The top-down approach can be empowered by civil servants and politicians who can be equal participants or otherwise engaged in living lab activities. Our findings suggest that urban living labs provide a promising approach for neighbourhood renewal, which has been dominated by centralized top-down planning and urgently needs tools for citizen involvement (Pennen & Bortel, 2015). Urban living labs could work as an intermediary bringing self-organizing groups and city developers together to co-create urban space (Horelli et al., 2015). However, this potential can be lost if urban living labs are poorly managed. In conclusion, three key lessons can be taken from the study:

1. *Successful urban living lab activities require sufficient time dedicated to early innovation process.* Urban living labs are usually established to solve complex problems for which several unsuccessful attempts have already been made. Urban living labs provide an opportunity to bring together stakeholders with diverse knowledge and experience, and to collaborate in tackling those problems. In order to actualize innovation potential, sufficient time should be dedicated to building relationships, exchanging knowledge, and establishing shared goals. Even in low-threshold settings, the participation of residents seems to require some citizen skills and relevant basic knowledge, and consequently, additional support and encouragement are needed (Veeckman & Graaf, 2015). Even though not all participants would engage in development projects as a result of the bottom-up process, building alliances across different boundaries is a valuable result from the perspective of networking.

2. *Innovations result from successful team processes.* Early innovation process took place in teams that enable relationships to be built and relevant knowledge to be constructed, as well as the exploration of ignorance and concepts (Darsø, 2003; Darsø & Høyrup, 2011). The present findings suggest that building relationships and sharing knowledge precede the exploration of ignorance and the innovation of new ideas and concepts. Iterating cycles form a progressive spiral, leading to the exploration of actor roles and the limits of expertise, and to the development of more nuanced concepts. There must be sufficient trust and confidence before members dare to reveal their ignorance and to express unconventional ideas, as well as to confront the opinions of others. Members also need to understand and share an evolving innovation concept in order to commit themselves to development projects.

3. *Prejects can be managed.* The present study provides some insights into preject management. First, the alternation of plenary discussions and working in groups created tension between general goals and the interests of participants, and it cross-fertilized innovative thinking among participants. The plenary discussions helped spread ideas across the teams and encouraged the sharing of feedback and additional resources. Second, special attention should be given to protecting and nurturing group processes, for example, using group facilitators. Under time pressure, teams tend to make premature decisions leading to rather conventional projects with limited commitment; therefore, the team should process their idea until something truly new to them emerges and they become emotionally engaged. However, group processes are difficult to maintain across the workshops due to fluctuations in participation. It could be advisable to build teams around key people who are strongly motivated. Third, of crucial importance is a constructive atmosphere that encourages discussions of ignorance and welcoming questions and criticism. Innovations can further be enhanced

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through specific interventions aimed at exploring ignorance and the limits of expertise. This can be simply done by asking questions, but more sophisticated tools are available (e.g., Virkkunen & Newnham, 2013). With these conditions, an urban living lab can provide a forum for creative collaboration and problem-solving in community and urban development.

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